secrete endothelial relaxing factors that may help prevent venous graft disease.

Finally, with regard to perioperative medical management, we believe that modern antiplatelet therapy has improved outcomes. We respectfully disagree with Kato and colleagues with regard to the need for warfarin in the modern practice. Dual antiplatelet therapy has replaced the use of warfarin sodium in our practice.

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CAN BOTH A2 AND P2 SCALLOP PROLAPSES IN BARLOW DISEASE BE REPAIRED SUFFICIENTLY WITH EDGE-TO-EDGE SUTURES?

To the Editor:

The recent article by De Bonis and colleagues[1] highlights the importance and outcomes of the edge-to-edge repair technique for mitral valve repair procedures. From 1993 to 2000, a total of 174 patients with severe degenerative mitral regurgitation were treated with the double-orifice technique combined with ring annuloplasty. Mitral regurgitation was caused by anterior leaflet prolapse in 36 patients, bileaflet prolapse in 128, and posterior leaflet prolapse in 10 patients. Their retrospective clinical and echocardiographic results are acceptable.[1] We congratulate De Bonis and colleagues[1] on their results.

A clarification can be obtained by viewing the disease as a pathophysiologic triad of the terms describing valve etiology, valve lesions resulting from the disease, and valve dysfunction resulting from the lesion.[2] Not only does this pathophysiologic triad facilitate communication among the cardiologist, the echocardiographer, and the surgeon, it also has significant clinical relevance for the individual patient.[2] Unfortunately, De Bonis and colleagues[1] did not document the etiologies among their patients. In this circumstance, there may be some confusion as to whether this technique can be safely applied in Barlow disease, because Barlow disease is generally associated with the most complex valve pathology and dysfunction.[3]

The advantages of the edge-to-edge repair technique include its ease of applicability both during the learning curve and later, especially in single-scallop prolapse, and its prevention of systolic anterior motion. De Bonis and colleagues[1] noted that the edge-to-edge suture is performed with deep bites to decrease the height of the leaflets, and postoperative systolic anterior motion can be effectively prevented even in huge myxomatous bileaflet prolapse resulting from Barlow's disease.[1] Although a deep bite can decrease both anterior and posterior leaflet height, it does not reduce the tension on the remaining chordae; some of the excess tissue should be therefore resected to maintain normal valve geometry, to reduce the tension on the remaining chordae, and to stop progression of the process. As shown by very long-term results,[4] the resection strategy should be performed according to the law of Laplace, which states that the larger the portion of a sphere, the greater the tension on its surface, and thus in this case on the chordae.[5] This technique therefore may result in leaflet tearing, which was also speculated on by De Bonis and colleagues.[1] We believe that a too-superficial stitch of the edge-to-edge suture is more likely responsible for that.

No matter which repair technique is performed, according to Carpentier's principles[5] creation of a large surface of coaptation is always essential, which necessitates a healthy suspension system (or subvalvular apparatus). This suspension system has two functions: one is to facilitate the opening of the leaflet during diastole (active opening), and the other is to prevent the upward displacement of the leaflet above the plane of the annulus during systole. Single-scallop prolapse can be repaired successfully because opposing a normal scallop's marginal chordae can prevent upward displacement of the previously prolapsing scallop when the edge-to-edge repair technique is performed. Performing the edge-to-edge repair technique may not be sufficient to suspend the prolapsing scallops in patients with both A2 and P2 prolapse, however, because there are no healthy marginal chordae to suspend the combined (sutured) A2 and P2 scallops. We think that this point is the main deficiency of the edge-to-edge repair technique.

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Reply to the Editor:

We thank Dr Tavlasoglu and coworkers for their interest in the double-orifice edge-to-edge technique and for the issues they addressed in their letter.

All of the patients included in our study had severe degenerative mitral regurgitation.[1] Therefore, patients with rheumatic, postendocarditic, ischemic, and functional mitral regurgitation were excluded. In our retrospective analysis, we were not able to establish exactly the number of patients who were affected by Barlow's disease and in how many cases, conversely, the typical features of fibroelastic deficiency were present. However, considering the characteristics of the patients who undergo mitral valve repair for pure degenerative mitral regurgitation at San Raffaele University Hospital (which have not significantly changed over the years), we can certainly state that the majority of the patients with bileaflet prolapse enrolled in our series were affected by Barlow's disease. The edge-to-edge technique was initially developed specifically to treat rapidly and effectively the most complex forms of this pathology. In our unit, where approximately 450 mitral repair procedures per year are performed, Barlow's disease was and remains one of the most important indications for the double-orifice edge-to-edge repair. Tearing of the edge-to-edge suture occurred in 1 patient included in this series, probably as a consequence of an overly superficial stitch. Indeed, particularly when redundancy of the leaflets is pronounced, an appropriate depth of the suture bite is necessary to counteract the tension on the leaflets. Provided that this technical issue is respected, suture tearing has never been a real issue in our experience. The 174 cases reported in this study represent only a small proportion of the overall number of patients treated with the double-orifice edge-to-edge repair at San Raffaele University Hospital during the last 20 years. Suture tearing or rupture has been an exceptional event, and the few cases registered mainly occurred in patients with mitral endocarditis.

Another point raised by Tavlasoglu and coworkers is that ''single scallop prolapse can be repaired successfully because opposing normal scallop's marginal chordae can prevent upward displacement of the previously prolapsing scallop when E-to-E repair technique is performed. However, performing the mentioned technique in cases with both A2 and P2 prolapse may not be sufficient enough to suspend the prolapsing scallops, because there are no healthy marginal chords to suspend the combined (sutured) A2-P2 scallops.''

Our opinion regarding this and other similar considerations is that, as for any surgical technique, the only way to validate the edge-to-edge repair is by means of standard outcome measures and analysis. Our clinical and echocardiographic data demonstrate excellent long-term results (up to 17.6 years) in terms of freedom from recurrence of mitral regurgitation even in bileaflet and anterior leaflet prolapse, which have traditionally been associated with less satisfactory outcomes compared with posterior leaflet prolapse. Approximately 20 years after their operation, the majority of those patients can still enjoy the well-known benefits of a successful and durable mitral repair operation. As a matter of fact, this is probably the best proof that most of the supposed drawbacks and hypothetic risks of the edge-to-edge technique are more theoretic than practical.

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CONCERNING EARLY AND LATE RESULTS OF TRAINING IN OFF-PUMP CORONARY ARTERY BYPASS SURGERY

To the Editor:

We recently read the interesting paper by Murzi and colleagues[1] in the ''Cardiothoracic Surgical Education and Training'' section of the *Journal*. Authors from a group with world-recognized leadership in off-pump coronary artery bypass surgery (OPCAB) compared performances of trainees with those of senior surgeons with respect to early clinical outcome and survival at a mean follow-up of approximately 5 years.

This article deserves attention for the important topic of training in surgical specialities and for some original paths of investigation, in addition to the already known large experience in systematic OPCAB of the Bristol group. We agree that multivessel OPCAB is a safe and reproducible technique that can be diffusely adopted and we concur that teaching OPCAB to cardiothoracic trainees should be a duty. Furthermore, the analysis